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Major depression in Chinese Americans

The roles of stress, vulnerability, and acculturation

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Abstract *Background* This study examined the relationship between recent negative life events, level of acculturation and other psychosocial risk factors in predicting major depression in Chinese Americans. *Method* Data were collected on 1,747 Chinese immigrants and native-born residents of the United States (ages 18–65) who resided in Los Angeles County between 1993 and 1994. *Results* Findings indicated that a positive psychiatric history increased risk for major depression at Time 2, while social conflicts and traumatic life events moderated the effects of negative life events in increasing risk for major depression. In addition, level of acculturation moderated the effects of recent negative events in increasing risk, but only for those who were more highly acculturated. *Conclusions* The importance of testing the cross-cultural applicability of the stress-vulnerability hypothesis among ethnic minorities and extending them to include immigrant vulnerabilities is discussed

Key words Chinese Americans – depression – stress – vulnerability – acculturation

Introduction

Despite considerable scientific and public attention given to depression over the years, relatively little is known about the etiology of depression in different

ethnic groups. The relationship between stress and depression has been a major area of focus for those interested in elucidating the complex etiology of depression [41]. However, few studies have investigated the relationship between stress and major depression in Chinese Americans. The few studies that are available find that negative life events increase risk for experiencing a major depressive episode [1, 2]. More sophisticated theoretical models have yet to be tested on Chinese Americans.

For example, stress has been conceptualized as not only a risk factor that increases susceptibility for depression, but also as a variable with which other risk factors interact. One widely accepted theory of disease development is the stress-vulnerability theory. The notion of vulnerability can be traced back to 131–201 A.D. in Galen's interpretation of Hippocratic theories of disease [3]. Stress-vulnerability theory posits that risk factors, known as vulnerabilities, moderate the effects of stress and increase risk for experiencing a major depressive episode [3]. A number of biological, developmental, psychological, and sociodemographic variables seem not only to act as both risk factors that increase risk for depression through independent effects, but also act as vulnerabilities and interact with stress to increase risk for depression in the general population [4, 5–8, 40]. In this study, we test the cross-cultural applicability of the stress-vulnerability hypothesis to Chinese Americans by examining whether specific risk factors that can also be conceived as vulnerabilities (i.e., social conflict, psychiatric history, and trauma exposure) moderate the relationship between stressful negative life events and depression.

It makes sense that those struggling with a considerable burden of social conflict, comorbid or past bouts of psychiatric illnesses, and/or those exposed to traumatic experiences would have greater difficulty adapting to and coping with negative life events than someone who have not been exposed to these expe-

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riences. For example, research indicates that episodic stressors such as negative life events act as triggers for depressive episodes, while vulnerabilities such as persistent social conflicts increase risk for depression by lowering the stress-depression threshold (i.e., the amount of additional stress needed to trigger a depressive episode) [6, 9, 10]. Specifically, because the individual is already struggling with a variety of problematic issues, it does not take much more to put them over the top.

■ Does level of acculturation increase risk for depression?

In summarizing the extant research available on acculturation and mental health outcomes, Escobar [11] notes that both physical and mental health problems seem to increase as immigrants acculturate [12]. This is evident in the case of syndromal depression, with foreign-born Latinos evidencing lower rates of major depression than US-born Latinos [11, 13–17]. In examining this issue among Chinese Americans, Hwang et al. [18] found a similar pattern, with Chinese Americans who grew up in the US evidencing higher rates of major depression than those who immigrated at older ages [18]. A number of methodological issues may temper these findings, including whether more acculturated immigrants simply express distress in ways that are more readily captured by Western assessment and diagnostic methods and whether more acculturated immigrants are more willing to disclose their difficulties to interviewers.

In addition, it is important to note that increased acculturation by itself does not create vulnerability for depression. Rather, level of acculturation serves as a proxy that identifies an at-risk group, but tells us little about the actual mechanisms that lead to a depressive episode. Few studies have been able to identify the factors that contribute to the apparent increased risk among the more acculturated. Escobar [11] proposed that as immigrants acculturate, their risk for depression may increase because they are exposed to increased acculturative stressors that they may not be used to facing and/or because they become disconnected from protective culturally-mediated social resources (e.g., strong family networks). However, because the Chinese American Psychiatric Epidemiological Study (CAPES) did not measure acculturative stress directly, we were unable to determine whether acculturative stress enhances risk for depression in Chinese Americans.

The stress-vulnerability hypothesis provides another possible explanation for why more acculturated immigrants appear to be at greater risk. Specifically, as one acculturates, one may not only be exposed to greater stress burden and different types of stressors, but may also become more vulnerable to the deleterious effects of stress, perhaps because of inadequate

coping resources. Researchers have yet to include culturally salient variables such as level of acculturation in testing the stress-vulnerability hypothesis. As the largest and most sophisticated longitudinal study to be conducted on an Asian American group to date, CAPES provides an opportunity to investigate whether traditional stress-vulnerability models have cross-cultural application when applied to Chinese Americans, and to explore whether culture-related issues such as level of acculturation make a significant additional contribution in accounting for stress-vulnerability for depression. If immigrants are indeed becoming more vulnerable to the effects of stress over time, it would be important to understand this process and develop clinical interventions (e.g., stress coping and management) that target the mechanisms of action.

Method

■ Data collection

Participants in this study included 1,747 Chinese immigrants and native-born residents of the United States (ages 18–65) who resided in Los Angeles County in 1993–1994. Since Chinese Americans comprised less than 3% of the total population of Los Angeles County in 1990, census tracts composed of at least 6% (6–72.3%) Chinese Americans were selected to increase the probability of locating and screening a Chinese American household. Sampling proceeded in four stages: (1) random selection of tracts composed of at least 6% Chinese Americans, (2) random selection of blocks within tracts, (3) random selection of households within blocks, and (4) random selection of individuals within households.¹

In the first wave of data collection (April 1993–August 1994), 16,916 households were visited and screened in order to obtain 1,747 completed interviews. Of the households selected for final screening, the response rate of 82% was comparable to that obtained in the National Comorbidity Study [15]. At the 18 month follow-up Time 2 interview, data from 1503 (86%) of the original respondents were collected. This sample is self-weighted, meaning that no respondent weights are necessary at the household level. At the respondent level, weights are inversely proportional to the number of persons eligible for interview in the household. Weights were applied to the sample data to adjust for demographic variables, non-response rates, and for the differential probabilities of selection within the household. The results presented from the analyses and tables are weighted.

Of those who completed both Time 1 and Time 2 interviews, 95% were 1st generation immigrants and resided in the US for an average of 12.38 years ($SD = 9.36$). About 25% of the sample reported speaking mostly or only Chinese in their daily lives, 14% reported speaking mostly or only English, while 61% of the participants reported speaking English and Chinese equally in their daily lives. Interviews were conducted in English (21.5%), Mandarin (67.4%), or Cantonese (11.1%) depending on the respondent's language preference. They were conducted by trained and fully fluent bilingual interviewers who were screened for language fluency, suitability and style of interviewing, and trained by certified bilingual staff.

¹For more detailed reports of sampling methodology and sample characteristics, see [1, 2, 18, 19].

■ Measures

Demographic variables

Information on gender, age, education, marital status, employment status, and income were obtained. Marital status consisted of three levels: married, never married, and separated, widowed, or divorced. Work status was coded as either currently working (full or part-time) or not working.

Diagnostic measure

The University of Michigan's version of the Composite International Diagnostic Interview (UM-CIDI) was used as the major diagnostic instrument [15]. The UM-CIDI is a structured interview schedule based on the Diagnostic Interview Schedule (DIS) and designed to be used by trained lay interviewers. In this study, the UM-CIDI provided information on whether respondents met criteria for a major depressive disorder during their lifetime or within the past 12 months. The dependent variable was 12 month major depression diagnosis at Time 2. Although the validity of the UM-CIDI has not been tested in a Chinese sample, the DIS has shown good reliability and validity for most diagnoses when modified for a Chinese sample [20–22]. The CIDI has demonstrated good inter-rater reliability [23], test-retest reliability [24], and validity [24, 25]. A shortened version of the UM-CIDI and optimal diagnostic cut-off points based on the results of the National Comorbidity Survey was used at Time 2 (R. C. Kessler & D. K. Mroczek, personal communication, April 13, 1993).

Psychiatric history

Lifetime and current prevalence of major depression, dysthymia, and anxiety disorders (agoraphobia, general anxiety disorder (GAD), panic attack, simple phobia, and social phobia) were assessed at Time 1 using the UM-CIDI. Respondents diagnosed with a current or past psychiatric disorder at Time 1 were coded as having a positive psychiatric history and those who had no diagnoses were coded as having no psychiatric history.

Traumatic life events

A sum score of respondent's lifetime experiences with ten different traumatic events (e.g., direct combat experience, physical abuse) was used to assess trauma exposure. The Trauma checklist was used in the National Comorbidity Survey (NCS) and originally derived from the post-traumatic stress disorder section of the Diagnostic Interview Schedule (DIS) [15, 26].

Acculturation

Level of acculturation was measured using a modified version of Burnam, Hough, Karno, Escobar, and Telle's [14] acculturation scale. About 14 of the original 26 items were selected by a team of reviewers such that the final measure tapped into various domains, including language use in a variety of situations, participation in cultural activities, and ethnic composition of one's social network and neighborhood. Questions assessing and scoring the respondents ethnic identification were taken out of the scoring procedure. In addition, two items, proportion of life lived in the US and generational status were added and scaled so that they matched the 5-point scale of the other items. Generational status was scored with 1st generation denoting immigrant generation, 2nd generation denoting the first generation born in the US, and 3rd generation denoting the second generation born in the US. An adjusted average was created and the scale evidenced good reliability in this sample (Cronbach Alpha = 0.88).

Recent negative events

Each participant was queried on whether they had experienced ten recent negative events within the past 12 months, such as being robbed, having a relationship breakup, and being in trouble with the law [10]. These events did not overlap with any of those assessed in the Traumatic Life Events checklist. An aggregate frequency count of eight of the ten items was used to create a sum recent negative events score. Two items were excluded because of their chronic nature (e.g., a long separation from a loved one; serious ongoing tensions, conflicts, or arguments with a close friend or relative).

Social conflict

Social conflict was measured using the UM-CIDI's modified version of Positive and Negative Social Interactions Scale [15, 27]. This scale was originally derived from a scale developed by Turner, Frankel, and Levin [28]. It measures three sources of perceived support and conflict: friend, family or relatives, and spouse. An adjusted average of spouse, family, and friend conflict subscales was used to create an aggregate social conflict score. The social interactions scale has evidenced good reliability and validity, with coefficient alphas for social interaction indices ranging from 0.78 to 0.90 in [1, 19].

■ Analysis procedures

Two sets of analysis of variances (ANOVAs) were used to determine group differences among a variety of independent predictor variables and the dependent variables of 12 month depression and stress exposure. For the purpose of analyzing group differences, cut-off points for level of acculturation, social conflict, and trauma exposure were made at one standard deviation above the mean. For trauma exposure, the cut-off point resulted in a group who had experienced one or more traumas and a group who did not.

Logistic regression was used to estimate the relative contributions of Time 1 demographic characteristics, vulnerabilities, and negative life events in predicting a major depressive episode at Time 2. A hierarchical multivariate logistic regression main effects model was used to assess the contribution of multiple predictor variables on 12 month major depression at Time 2, while taking into account the effects of other predictor variables. Variables were entered in five hierarchical blocks in invariant order: (1) demographic variables (gender, age, education, marital status, work status, and income); (2) general vulnerabilities (traumatic life experiences and psychiatric history); (3) immigrant status risk (level of acculturation); (4) negative life events; and (5) social conflict. Finally, a series of separate 2-way interactions were tested in a 6th block and used to test potential moderating relationships between negative life events and various vulnerabilities in predicting depression. Although social conflict is conceptualized as a vulnerability factor in the tests of moderation, it was entered later in the main effects model because it is a type of chronic stressor and we wanted to test its independent contribution as a source of chronic stress just prior to testing the contribution of episodic negative life events. Cut-off points for categorizing continuous independent variables were made at one standard deviation above the mean.

Results

At Time 1, 61 participants (3.5%) met criteria for 12 month major depression (31 males, 30 females), and 120 participants (6.87%) met criteria for a lifetime major depressive episode (57 males, 63 females). At Time 2, 68 participants (4.5%) met criteria for

Table 1 Time 1 characteristics of those who became depressed at Time 2

Variable	All		Depressed		Non-depressed		F or χ^2	P =
	Frequency or mean	SD or %	Frequency or mean	SD or %	Frequency or mean	SD or %		
Gender:							4.22	0.04
Female	745	49.6%	42	61.8%	703	49.0%		
Male	757	50.4%	26	38.2%	731	51.0%		
Age:	38.38	12.65	40.39	10.27	38.3	12.74	1.55	0.21
Education:	13.03	3.78	13.03	4.48	13.03	3.75	0.00	0.99
Marital status:							3.72	0.16
Never married	435	28.9%	15	21.7%	420	29.3%		
S/W/D	72	4.8%	6	8.7%	66	4.6%		
Married	996	66.3%	48	69.6%	948	66.1%		
Work status							0.66	0.42
Not working	660	43.9%	27	39.1%	633	44.1%		
Working	844	56.1%	42	60.9%	802	55.9%		
Income:	15.61	5.02	16.2	4.33	15.58	5.05	0.86	0.35
Psychiatric Hx							33.48	0.00
Present	174	11.6%	23	33.3%	151	10.5%		
Absent	1330	88.4%	46	66.7%	1284	89.5%		
Trauma total	0.6	0.98	0.9	1.21	0.59	0.97	5.60	0.02
Acculturation	1.99	0.7	2.12	0.84	1.99	0.69	1.87	0.17
Total conflict	0.10	0.11	0.13	0.11	0.10	0.11	2.70	0.10
Recent neg events total	0.35	0.62	0.73	0.83	0.34	0.6	23.44	0.00

major depression (26 males, 42 females), 55 (81%) reported their first episode (i.e., no reported previous history of MDD at Time 1), and 13 (19%) reported having had a prior depressive episode (six were depressed at Time 1).

Time 1 characteristics of those who became depressed at Time 2 are presented in Table 1. Results indicated that a significantly greater proportion of women than men were depressed at Time 2, and that those who became depressed were more likely to have a prior psychiatric history and to have experienced more traumas and negative life events than those who were not depressed.

■ Differences in stress level as a function of vulnerability

Analysis of variances were conducted to determine whether stress levels differed as a function of psychiatric history, trauma exposure, and level of acculturation. Those with prior psychiatric histories were significantly more likely to report experiencing more negative life events ($\bar{M} = 0.58$, $\underline{SD} = 0.79$ vs. $\bar{M} = 0.32$, $\underline{SD} = 0.58$) and more social conflicts ($\bar{M} = 1.51$, $\underline{SD} = 0.48$ vs. $\bar{M} = 1.32$, $\underline{SD} = 0.36$) than those without such histories ($F(1, 1410) = 25.15$, $P < .01$; $F(1, 1409) = 39.36$, $P < .01$, respectively). Those who experienced prior traumas were also significantly more likely than those who had not experienced prior trauma to report experiencing more negative life events ($\bar{M} = 0.47$, $\underline{SD} = 0.70$ vs. $\bar{M} = 0.28$, $\underline{SD} = 0.55$) and more social conflicts ($\bar{M} = 1.39$, $\underline{SD} = 0.41$ vs. $\bar{M} = 0.35$, $\underline{SD} = 0.35$) ($F(1, 1410) = 31.05$, $P < .01$; $F(1, 1409) = 13.55$, $P < .01$, respectively). Finally, those who were more highly

acculturated were significantly more likely to report experiencing more negative life events ($\bar{M} = 0.49$, $\underline{SD} = 0.74$ vs. $\bar{M} = 0.34$, $\underline{SD} = 0.60$) and social conflicts ($\bar{M} = 1.51$, $\underline{SD} = 0.41$ vs. $\bar{M} = 1.32$, $\underline{SD} = 0.37$) than those who were less acculturated ($F(1, 1395) = 8.25$, $P \leq .01$; $F(1, 1394) = 36.84$, $P \leq .01$, respectively).²

■ Main effects

Results from the hierarchical regression indicated that women evidenced significantly greater risk than men for becoming depressed at Time 2. Those with a prior psychiatric history were more likely to become depressed than those without a psychiatric history, but those who reported experiencing traumas were no more likely to become depressed than those who did not. Neither level of acculturation nor level of social conflict experienced were significant independent predictors of depression. However, increased exposure to recent negative events increased the likelihood of experiencing a major depressive episode. These results are presented in Table 2.

■ Moderated effects

In order to test possible moderating relationships, a series of independent 2-way interactions were entered into the hierarchical regression model in the third phase of the analyses. Results are presented in Table 3. Since several demographic variables (age, edu-

²Please note that although group differences in recent negative life events and social conflict were significant, the absolute differences were small and should be interpreted with caution.

Table 2 Hierarchical logistic regression (T1 variables predicting T2 12 month depression)

Variable	Block 1 OR (95% CI)	Block 2 OR (95% CI)	Block 3 OR (95% CI)	Block 4 OR (95% CI)	Block 5 OR (95% CI)
Gender					
Female	1.68 (1.00–2.82) ^a	1.81 (1.06–3.07) ^a	1.84 (1.08–3.12) ^a	1.82 (1.07–3.09) ^a	1.74 (1.02–2.96) ^a
Male					
Age:	1.01 (0.98–1.04)	1.00 (0.97–1.03)	1.00 (0.98–1.03)	1.00 (0.98–1.03)	1.00 (0.98–1.03)
Education:	1.03 (0.96–1.11)	1.04 (0.96–1.12)	1.02 (0.95–1.11)	1.02 (0.95–1.11)	1.02 (0.94–1.10)
Marital status:					
Never married	0.90 (0.42–1.91)	0.88 (0.41–1.88)	0.80 (0.36–1.76)	0.80 (0.36–1.77)	0.77 (0.35–1.71)
S/W/D	1.60 (0.63–4.10)	1.39 (0.53–3.62)	1.32 (0.51–3.46)	1.38 (0.52–3.62)	1.32 (0.50–3.52)
Married					
Work status					
Not working	0.79 (0.44–1.42)	0.72 (0.40–1.30)	0.74 (0.41–1.34)	0.74 (0.41–1.34)	0.75 (0.41–1.36)
Working					
Income:	1.01 (0.95–1.08)	1.01 (0.95–1.07)	1.00 (0.94–1.07)	1.00 (0.94–1.07)	1.00 (0.94–1.07)
Psychiatric Hx		4.03 (2.28–7.12) ^b	3.95 (2.23–6.99) ^b	3.76 (2.09–6.78) ^b	3.51 (1.94–6.36) ^b
Trauma total		1.19 (0.96–1.47)	1.18 (0.95–1.47)	1.16 (0.92–1.45)	1.08 (0.86–1.36)
Acculturation			1.26 (0.85–1.85)	1.22 (0.82–1.81)	1.18 (0.79–1.76)
Total conflict				1.26 (0.66–2.40)	1.10 (0.57–2.14)
Recent neg events total					1.65 (1.19–2.28) ^b

^a $P \leq 0.05$; ^b $P < 0.01$

cation, marital status, work status, and income) were not associated with depression in the multivariate main effects model, they were excluded as controls in subsequent analyses testing the interactions. The main effects of gender, psychiatric history, traumatic life experiences, acculturative status, social conflict, and recent negative life events, were controlled in all tests of moderating relationships.

Recent negative events and social conflict

As shown in Fig. 1, results indicated a significant interaction between recent negative events and social conflict in predicting depression, such that those who reported more social conflicts were at increased risk for becoming depressed following fewer negative events than those who experienced less social conflict, which supports the stress-vulnerability hypothesis. The mean predicted value along the Y-axis refers to the mean predicted probability of experiencing a major depressive episode.

Stress and psychiatric history

Negative life events did not interact with psychiatric history, indicating that psychiatric history conferred risk for future depression independent of life events.

Stress and trauma

On the other hand, there was a significant interaction between recent negative events and prior trauma in predicting depression. As shown in Fig. 2, participants who experienced more negative life events evidenced an increased likelihood of having a depressive episode regardless of whether they had experienced

Table 3 Stress-moderating relationships in predicting 12 month major depression

Stress-vulnerability Interactions	OR	(95% CI)	P
Recent negative events × Social conflict	0.38 ^a	(0.18–0.82)	0.01
Recent negative events × Psychiatric history	1.51	(0.78–2.92)	0.22
Recent negative events × Trauma	0.65 ^b	(0.49–0.85)	0.00
Recent negative events × Acculturation	1.52 ^a	(1.03–2.25)	0.04

^a $P \leq 0.05$; ^b $P \leq 0.01$

Note: Interactions control for the main effects of gender, psychiatric history, trauma, acculturation, social conflict, and recent negative events.

prior traumas or not, and those with previous trauma exposure were more likely to become depressed following fewer negative events than those without a history of trauma.

Stress and level of acculturation

Level of acculturation moderated the effects of recent negative events in predicting depression (see Fig. 3). Specifically, negative life events conferred greater risk for Chinese Americans who were more acculturated than those who were less acculturated. However, under low stress conditions, level of acculturation did not confer any significant additional risk for becoming depressed. These results support the hypothesis that increased acculturation appears to exacerbate the impact of negative life events in predicting the likelihood of a major depressive episode, but only under conditions of high episodic life stress.

Discussion

Do prevailing risk models examining the relationship between stress, vulnerability, and depression hold for

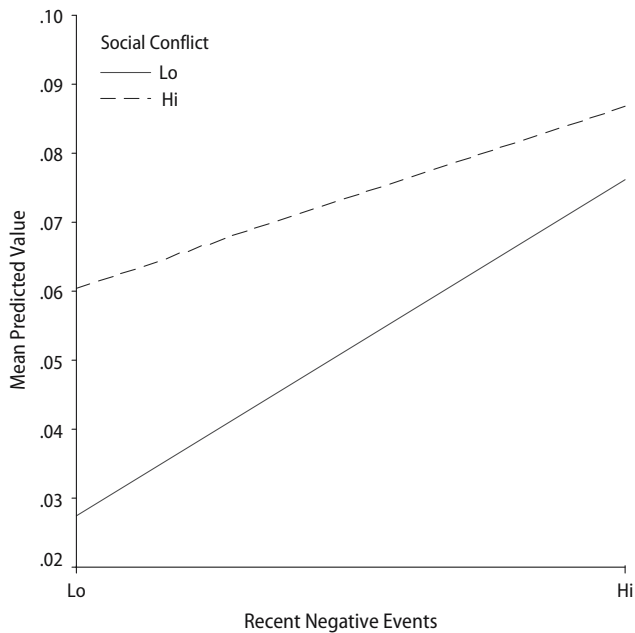


Fig. 1 Recent negative events and social conflict interaction in predicting 12 month major depression

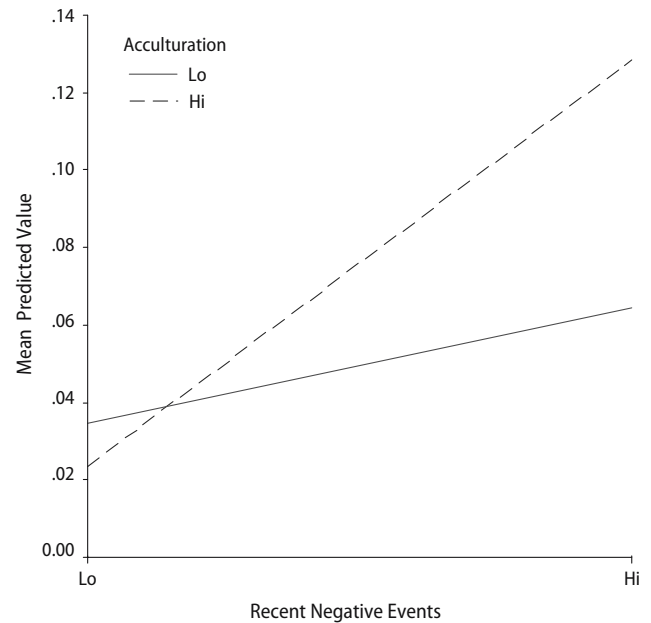


Fig. 3 Recent negative events and level of acculturation interaction in predicting 12 month major depression

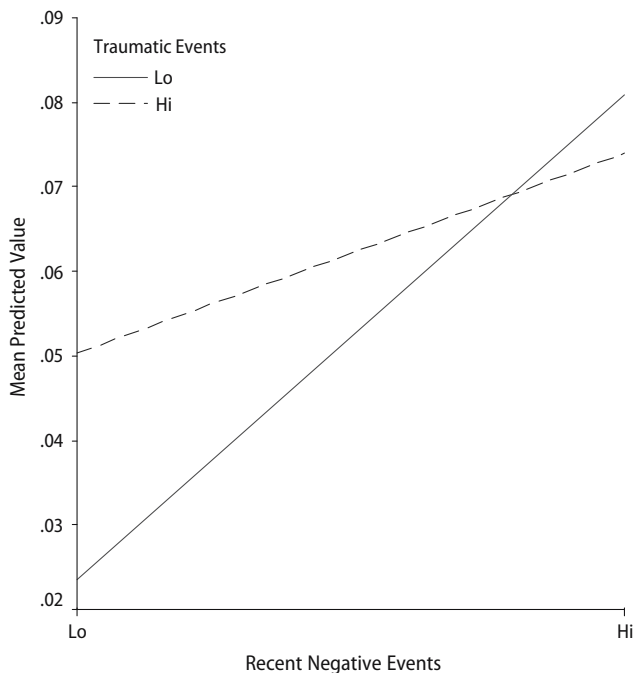


Fig. 2 Recent negative events and traumatic life experiences interaction in predicting 12 month major Depression

Chinese Americans? Results from the longitudinal study on Chinese Americans in the CAPES suggest that they do. Time 1 recent negative life events were associated with increased risk for experiencing a major depressive episode at Time 2, and this effect was enhanced by exposure to more social conflicts, a

history of prior trauma, and by greater acculturation. Most of these relationships suggest that these vulnerabilities are associated with sensitization to life event stress (i.e., fewer life events necessary to trigger an episode in those with a trauma history and in those exposed to more social conflicts). The one exception was level of acculturation, which appeared to enhance the impact of negative life events, but only in those who were more acculturated.

■ Stress, vulnerability, and depression

Results from this study suggest that stress plays both direct and indirect roles in increasing risk for a major depressive episode among Chinese Americans. Episodic life events stress exerted direct effects in triggering a depressive episode, while vulnerabilities such as social conflict set the stage for a depressive episode by lowering the stress-depression threshold. These results are generally consistent with those observed among Americans in general [6, 9, 10]. Due to the collectivistic nature of Asian cultures and their emphasis on maintaining harmony, social conflicts are reported to have a more negative impact on Asian and Asian Americans than on Caucasian Americans [29, 30]. In this study, we found that persistent failure to cope effectively with social conflict increased risk and set the stage for negative life events to trigger a depressive episode.

Compared to other risk factors, psychiatric history evidenced the strongest direct predictive relationship with depression in this sample. This finding is consistent with previous research showing that a high

psychiatric burden (e.g., past depression, history of other psychopathology, co-morbid disorders, family history of psychopathology) is one of the most robust and consistent predictors of subsequent major depression in other groups [4, 31; 8]. Also consistent with prior research, Chinese Americans who evidenced greater psychiatric burden reported more negative life events and higher social conflict than those without such a history [32].

On the other hand, exposure to traumatic life events did not increase risk for depression in Chinese Americans as reported in other studies with other groups [33, 34]. However, consistent with the stress-vulnerability hypothesis, which hypothesizes that prior experience of trauma increases vulnerability to future stresses [6, 35], traumatic life events interacted with negative life events to increase risk for depression by lowering the stress-depression threshold. Chinese Americans who experienced traumas also reported more negative life events and higher social conflict than those who did not, which is consistent with other research [35].

■ Stress, acculturation, and depression

Our current understanding of the relationship between acculturation and risk for depression is relatively limited, especially in Chinese Americans. In this study, more acculturated Chinese Americans reported greater exposure to negative life events and social conflicts. However, level of acculturation did not increase risk for depression. Instead, the evidence suggests a more complex relationship, with level of acculturation moderating the effects of negative life events and exacerbating risk for depression for those more highly acculturated. Conversely, the findings could mean that those who were less acculturated were more resilient to the effects of stress and were better able to cope when negative life events occurred. It has been hypothesized that the process of acculturation may involve the gradual loss of protective cultural factors and increased exposure to stressors and other risk factors that immigrants may not be prepared or equipped to handle [12]. Future research should focus on identifying which culturally protective factors are lost overtime and testing whether such losses result in increased vulnerability to stress. Alternatively, the findings could also suggest that less acculturated respondents may be less likely to report depression as negative life events increase and stress mounts than those who are more acculturated.

To our knowledge, this is the first study that has tested the interaction between stress and acculturative status among Chinese Americans diagnosed with major depression. However, it is important to highlight that changes in risk for depression do not occur simply because one migrates to a new environment, but rather is a direct or indirect consequence of other changes that have occurred. As one acculturates, one has to learn to

conform, adapt, meet the demands of, and negotiate two different cultural environments. For Chinese Americans, this process may involve becoming more individualistic and less collectivistic, and lead to concomitant changes in the salience of their ethnic identity, social attitudes, expectations, coping styles, movement away from traditional social networks, and reductions in social support. Increased acculturation may also increase exposure to culturally-incongruent stressors (e.g., intergenerational conflict, culture clash, discrimination and racism, shifts in family dynamics, and increased individualism) that effectively undermine cultural protections (i.e., strong collectivistic orientation and strong family and group cohesion). Therefore, developing and testing more complex disease vulnerability and resilience models for understudied populations is clearly needed.

As with most studies, results of this study may be strongly influenced by the characteristics of the sample (e.g., age at immigration, where they immigrated from, conditions and reasons for migration, pre-post migration experiences, and where they immigrate to). In this study, most respondents were either immigrants or children of immigrants. Therefore, while those who were more acculturated were more vulnerable to stress, it would be important to confirm whether these findings hold among those who have been in the US for several generations. It is important to note that the relationship between acculturation and level of stress is not always a linear one. As immigrants acculturate, they may also learn ways of coping with stress, develop more self-confidence, and develop skills that help them to better negotiate their new environments. It would also be important to disaggregate how sample characteristics and definitions of outcome influence research findings. Some research has shown that when we examine depressive symptoms rather than diagnoses, foreign-born Asian Americans evidence higher symptomatology than US-born Asian Americans [36]. This indicates that the etiology for depressive symptoms and syndromal depression may be different. It may also be that more acculturated Asian Americans express their depression in a way that may be more readily detected by Western assessment methods. Moreover, less acculturated refugees or those exposed to trauma prior to entry may also be more vulnerable to the effects of stress than those may have fewer difficulties to cope to [37].

■ Limitations

Although our study presents a number of interesting findings, several limitations deserve attention. For example, although the UM-CIDI has demonstrated good reliability and validity for Chinese, the short version of the UM-CIDI, which was used at Time 2, has yet to be formally validated in this population. In addition, a 6-month gap between Time 1 twelve-month

current depression and Time 2 twelve-month current depression existed because of the 18-month interval between Time 1 and Time 2 interviews. Although the gap was small, it is possible that some individuals could have had a first episode during this gap. In addition, although the sample was weighted to better represent Chinese Americans living in Los Angeles County, the sampling procedure constrained our ability to generalize findings to Chinese Americans living in greater Los Angeles county and across the US.

In addition, information on timing, duration, and severity of stresses experienced, or on the timing, duration, and severity of the depressive episode was not obtained, therefore more sophisticated hypotheses could not be tested. Although psychiatric history was controlled for in the analyses, it is also still possible that the observed interaction effects identified in this study may be influenced by Time 1 depression because those who became depressed may have been experiencing a first or subsequent episode of depression.

Finally, we acknowledge that unidimensional measures of acculturation may be too simplistic and leave out valuable information about a person's bicultural orientation [38]. Berry [13] proposed a multidimensional alternative measure of acculturation strategies that assesses a person's degree of cultural affiliation and maintenance vs. degree of contact and participation with other groups, and argues that this may be a more favorable way of deconstructing this complex phenomenon. Others have argued that a person's ethnic identity, or a subjective sense of belonging to a group, would also be more appropriate [39]. Unfortunately, these terms are often used interchangeably, with little consensus in the field to answer this complex question, and little research identifying and testing the underlying mechanisms that may be associated with these more global risk factors. We also acknowledge that level of acculturative stress, which is conceptually different from level of acculturation, was not specifically measured. Therefore, it is not possible to determine whether the effects of acculturation assessed are not more attributable to the stresses experienced as part of the acculturative process rather than simply due to their level of acculturation.

Despite these limitations, CAPES is the largest and most sophisticated longitudinal mental health epidemiological study conducted on any Asian American group. Findings provide several important contributions to our current understanding of stress-vulnerability relationships among Chinese Americans, and also extend tests of stress-vulnerability to include immigrant risk factors such as increased acculturation in predicting risk for depression among Chinese Americans.

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